CLAIMS

WE CLAIM:

1. A solid-state transducer comprising:

a substrate forming a support structure and having an opening;

a thin-film structure forming a diaphragm responsive to fluid-transmitted acoustic pressure and disposed over the opening;

a plurality of supports;

means for connecting the periphery of the diaphragm to the supports, wherein the connecting means strains to permit the diaphragm to move relative to the supports to relieve film stress in the diaphragm; and

a plurality of stop bumps disposed between the substrate and the diaphragm, the stop bumps determining the separation of the diaphragm from the substrate when the transducer is biased.

2. The transducer of claim 1 wherein the substrate is formed of a semi-conductor.

3. The transducer of claim 2, wherein the semi-conductor is silicon.

4. The transducer of claim 1, wherein the transducer is a microphone.

5. The transducer of claim 1 wherein the stop bumps are fabricated from an insulating material.

6. The transducer of claim 1 wherein the stop bumps are fabricated from a conductive material having an outer layer of insulating material.

7. The transducer of claim 1 including twenty of the stop bumps.

8. The transducer of claim 1 wherein each of the stop bumps is anchored to the substrate and not to the diaphragm.

9. The transducer of claim 1 wherein each of the stop bumps is anchored to the diaphragm and not to the substrate.

10. The transducer of claim 1 wherein the connecting means comprises a plurality of arms extending tangentially from the diaphragm edge.

11. The transducer of claim 10 wherein the arms are generally arcuate.

12. The transducer of claim 1 including a back plate, wherein the back plate is smaller than the diaphragm and the center of the back plate is aligned with the center of the diaphragm to minimize parasitic capacitance.

13. The transducer of claim 1 including a backplate disposed between the substrate and the diaphragm, and wherein the stop bumps determine the separation of the diaphragm from the backplate when the transducer is biased.

14. A solid-state transducer comprising:

a semi-conductor substrate forming a support structure and having an opening;

a thin-film structure forming a diaphragm responsive to fluid-transmitted acoustic pressure and disposed over the opening, the diaphragm including a plurality of tangentially extending arms;

a plurality of semi-conductor supports coupling each of the arms to the substrate; and

a plurality of stop bumps disposed between the substrate and the diaphragm, the stop bumps determining the separation of the diaphragm from the substrate when the transducer is biased.

15. The transducer of claim 14, wherein the transducer is a microphone.

16. The transducer of claim 14 wherein the stop bumps are fabricated from an insulating material.

17. The transducer of claim 14 wherein the stop bumps are a fabricated from a conductive material having an outer layer of insulating material.

18. The transducer of claim 14 including twenty of the stop bumps.

19. The transducer of claim 14 wherein each of the stop bumps is anchored to the substrate and not to the diaphragm.

20. The transducer of claim 14 wherein each of the stop bumps is anchored to the diaphragm and not to the substrate.

21. The transducer of claim 14 including a back plate, wherein the back plate is smaller than the diaphragm and the center of the back plate is aligned with the center of the diaphragm to minimize parasitic capacitance.

22. The transducer of claim 14 including a backplate disposed between the substrate and the diaphragm, and wherein the stop bumps determine the separation of the diaphragm from the backplate when the transducer is biased.

23. A solid-state transducer comprising:

a semi-conductor substrate forming a support structure and having an opening;

a thin-film structure forming a diaphragm responsive to fluid-transmitted acoustic pressure and disposed over the opening;

a plurality of semiconductor supports; and

means for connecting the periphery of the diaphragm to the supports, wherein the connecting means strains to relieve film stress in the diaphragm.

24. The transducer of claim 23 including a plurality of stop bumps disposed between the substrate and the diaphragm, the stop bumps determining the separation of the diaphragm from the substrate when the transducer is biased.

25. The transducer of claim 23, wherein the transducer is a microphone.

26. The transducer of claim 23 wherein the stop bumps are fabricated from an insulating material.

27. The transducer of claim 23 wherein the stop bumps are fabricated from a conductive material having an outer layer of insulating material.

28. The transducer of claim 23 including twenty of the stop bumps.

29. The transducer of claim 23 wherein each of the stop bumps is anchored to the substrate and not to the diaphragm.

30. The transducer of claim 23 wherein each of the stop bumps is anchored to the diaphragm and not to the substrate.

31. The transducer of claim 23 wherein the connecting means comprises a plurality of arms extending tangentially outwardly from the diaphragm

32. The transducer of claim 23 including a back plate, wherein the back plate is smaller than the diaphragm and the center of the back plate is aligned with the center of the diaphragm to minimize parasitic capacitance.

33. The transducer of claim 23 including a backplate disposed between the substrate and the diaphragm, and wherein the stop bumps determine the separation of the diaphragm from the backplate when the transducer is biased.